DOCUMENT RESUME

ED 095 382 CE 001 946

TITLE	Designing the Computer Program--Intermediate, Data Processing Technology: 8025.22.
INSTITUTION	Dade County Public Schools, Miami, Fla.
PUB DATE	Nov 72
NOTE	18p.; An Authorized Course of Instruction for the Quinmester Program
EDRS PRICE	MF-$0.75 HC-$1.50 PLUS POSTAGE
DESCRIPTORS	Behavioral Objectives; Case Studies; Computers; Computer Science Education; Course Content; *Curriculum Guides; *Data Processing; *Decision Making; Electronic Data Processing; Junior Colleges; *Problem Solving; Programers; Secondary Grades
IDENTIFIERS	*Quinmester Program

ABSTRACT

This course outline has been prepared to provide a practical foundation on which data problem solving can be based, and to discipline the student in the art of logical decision-making through lecture and practical case studies for applying the data processing concepts needed to become a programer. Skills and/or knowledge of processing data electronically are prerequisites of the course. This 90-hour course consists of six blocks of instruction (orientation, necessary basics, flowchart/block diagram, instructions, laboratory practice, and Quinmester posttests) which are further subdivided into several units each. Included are course goals, specific block objectives, a course outline, a five-item bibliography, and an appendix of Quinmester posttest samples and answer keys. (Author/BP)

ED 095382

VT

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY.

BEST COPY AVAILABLE

AUTHORIZED COURSE OF INSTRUCTION FOR THE QUINMESTER PROGRAM

Course Outline
DATA PROCESSING TECHNOLOGY - 8025
(Designing the Computer Program - Intermediate)
Department 73 - Quin 8025.22

CE001 946

DALE COUNTY PUBLIC SCHOOLS
DIVISION OF INSTRUCTION - 1973

ED 095382

D A D E C O U N T Y P U B L I C S C H O O L S

1 4 5 0 N O R T H E A S T S E C O N D A V E N U E

M I A M I, F L O R I D A 33132

BEST COPY AVAILABLE

Course Outline

DATA PROCESSING TECHNOLOGY - 8025
(Designing the Computer Program - Intermediate)

Department 73 - Quin 8025.22

county office of

VOCATIONAL AND ADULT EDUCATION

BEST COPY AVAILABLE

THE SCHOOL BOARD OF DADE COUNTY

Mr. G. Holmes Braddock, Chairman
Mr. William H. Turner, Vice-Chairman
Mrs. Ethel Beckham
Mrs. Crutcher Harrison
Mrs. Phyllis Miller
Mr. Robert Renick
Dr. Ben Sheppard

Dr. E. L. Whigham, Superintendent of Schools
Dade County Public Schools
Miami, Florida 33132

November, 1972

Published by the School Board of Dade County

Course Description

BEST COPY AVAILABLE

8025	73	Quin 8025.22	Designing the Computer Program - Intermediat
State Category Number	County Dept. Number	County Course Number	Course Title

Presenting the student with problem definitions and objectives; program analysis, documentation and reports. Developing the solution through system and detail flowcharting.

Clock Hours: 90

PREFACE

This course outline has been prepared to provide a practical foundation upon which data problem solving can be based, and to discipline the student in the art of logical decision making through lecture and practical case studies for applying the data processing concepts needed to become a programmer.

This quinmester course is designed to instruct the student in basic tools and materials needed to become a programmer; to give computer concepts of programming and coding; to give programming procedures of defining the problem; flowcharting; and problems which serve to bridge the gap from the academic to the real world of data processing. The two-hour per day session gives the opportunity to reinforce basic principles by providing "hands-on" training.

The first week of the course provides for review and introduction of the computer system to be used - memory/storage, machine description and input/output devices. The following eight weeks the student will be given instructions for solving given problems through program analysis; documentation and reports; and developing a solution through system and detail flowcharting.

In presenting the material outlined for this course, classroom instruction will include lectures, demonstrations, student participation and student projects. After instruction and practice on the operations that have been studied, evaluation of the students' skill and understanding is made.

This 90-hour course consists of six blocks of instruction which are further subdivided into several units each. Skills and/or knowledge of processing data electronically are prerequisites of the course.

This outline was developed through the cooperative efforts of the instructional and supervisory personnel, the Quinmester Advisory Committee, and the Vocational Curriculum Materials Service, and has been approved by the Dade County Vocational Curriculum Committee.

TABLE OF CONTENTS
With Suggested Hourly Breakdown

	Page
PREFACE	i
GOALS	iv
SPECIFIC BLOCK OBJECTIVES	v
BIBLIOGRAPHY	3
BLOCK	
I. ORIENTATION (4 Hours)	
Introduction to the Course	1
Student Responsibilities	1
II. NECESSARY BASICS (920 Hours)	
Requirements of the System	1
Report Requirements	1
Analyzing the Facts	1
Organization of the System	1
Approach to Data Flow and System Design	1
III. FLOWCHART/BLOCK DIAGRAM (25 Hours)	
Purpose/Reasons	1
Flowcharting Symbols	2
Types of Flowcharts	2
Presentation	2
Problem Solving	2
IV. INSTRUCTIONS (20 Hours)	
Card System	2
Magnetic Tape/Disk System	2
V. LABORATORY PRACTICE (21 Hours)	
Problem	2
Symbols	2
Flowcharting	2
VI. QUINMESTER POST-TEST	
APPENDIX - QUINMESTER POST-TEST SAMPLE	5

GOALS

The student must be able to demonstrate:

1. The ability to construct a readable format (report form) for a given problem.

2. The ability to give a graphic representation of the where or why for actions taken during the processing of data (flowcharting the logical solution to basic problems for machines and data).

3. An understanding of the functions of a computer system.

4. The ability to activate the input/output devices through instructions given in documentations and reports.

5. The ability to perform with accuracy the steps necessary in obtaining a solution to a given problem by flowcharting (system and detail).

6. An understanding of the way in which a number of instructions are written in basic language of the computer, and with the logical selection and arrangement of these instructions, to solve a variety of processing problems.

7. An understanding of basic concepts underlying programming and a variety of program instructions in the form of English language statements and block diagram.

SPECIFIC BLOCK OBJECTIVES

BLOCK I - ORIENTATION

The student must be able to:

1. Discuss the objectives and purpose of the course.
2. Demonstrate an understanding and acceptance of his duties and responsibilities in relation to care of materials used whether owned or classroom maintained.

BLOCK II - NECESSARY BASICS

The student must be able to:

1. Define data processing terms used in the course.
2. Discuss the basic elements of a computer system and, with reasonable accuracy, the function of the components he will use.
3. Demonstrate an understanding of the terminology used in the data processing field in relation to problem definitions, program analysis, documentation and reports.
4. Explain proper procedure in analyzing the facts for specific problem statements and discuss the approach for proper solution to problem statements, as to the documents involved and to the computer units, through which data must pass.
5. Write specific requirements for various business reports such as calculating a payroll for a given period.
6. Analyze facts and interpret these facts in order to flowchart a solution for these facts.

BLOCK III - FLOWCHART/BLOCK DIAGRAM

The student must be able to:

1. Explain the reason and purpose for having a flowchart accompany a given problem.
2. List symbols, their shape and meaning, shown on a template used in data processing.
3. Discuss all symbols and their functions used in the construction of a flowchart/block diagram for a given problem.
4. Construct a graphic solution of a written problem to include the computer system to be used and the instructions formatted for the system.
5. Construct flowcharts depicting symbolically the steps followed by the computer in the flow of data operations in solving a given problem.
6. Move data (graphically) into the print area of the computer with spacing between the columns and margins as specified by the problem.
7. Demonstrate an understanding of the concept of the logic that must be followed in planning a program.
8. Exhibit the ability to modify steps in the program to handle exceptions or changes.

9. Explain how the computer can be locked into a series of steps that lead to the processing of mass repetitive data.

10. Write English language instructions for reading data, punching data, printing data, moving data, branching, testing for last card, and halting.

BLOCK IV - INSTRUCTIONS

The student must be able to:

1. Discuss instructions for reading, punching, printing and moving data and branching and halting on either a card, tape or disk system (system to be used).
2. Demonstrate an understanding of the terminology used in instructing the computer.
3. Discuss the characteristics and organization of the system (card, tape or disk).
4. Interpret instructions written to solve problems in the system (card, tape or disk).

BLOCK V - LABORATORY PRACTICE

The student must be able to:

1. Diagram problems from the problem statement to include data flow and machine flow (system and detail flowchart the problem).
2. Demonstrate his concept of the logic that must be followed in planning a program.
3. Construct flowcharts depicting symbolically the steps followed by the computer in solving a problem.
4. Exhibit the ability to carry through a computer project from form designing to detail and general flowcharting.

BLOCK VI - QUINMESTER POST-TEST

The student must be able to:

1. Satisfactorily complete the quinmester post-test.

Course Outline

DATA PROCESSING TECHNOLOGY - 8025
(Designing the Computer Program - Intermediate)

Department 73 - Quin 8025.22

I. ORIENTATION

A. Introduction to the Course
   1. Objectives
   2. Purpose
      a. Documentation of the problem
      b. A guide and aid to writing programs and instructions

B. Student Responsibilities
   1. Regulations in use of tools and materials
   2. Regulations in care of tools and materials

II. NECESSARY BASICS

A. Requirements of the System
   1. Fact gathering techniques
   2. Recording the facts

B. Report Requirements
   1. Types of reports
   2. Report analysis
   3. Documentation
   4. Operating reports or documents

C. Analyzing the Facts

D. Organization of the System
   1. Components
   2. Instruction format
   3. Storage organization
   4. Instruction and data flow

E. Approach to Data Flow and System Design
   1. Problem definition
   2. Objectives
   3. Desired results

III. FLOWCHART/BLOCK DIAGRAM

A. Purpose/Reasons
   1. Defining the problem
   2. Developing the program
   3. Determining that no areas are left uncovered
   4. Coding the program
   5. Documenting the project
   6. Debugging (eliminating the program errors)

B. Flowcharting Symbols
   1. Template description
   2. Symbol description

C. Types of Flowcharts
   1. General - procedures
   2. Detail - procedures
   3. Systems

D. Presentation
   1. Testing for end condition
   2. Decision symbols and techniques
   3. Use of counter and flip flop
   4. Card and tape/disk input/output

E. Problem Solving
   1. Problem definition/statement
   2. Flowcharting

IV. INSTRUCTIONS

A. Card System
   1. Input/output
   2. Data movement
   3. Arithmetic
   4. Logic and branching
   5. Control

B. Magnetic Tape/Disk System
   1. Characteristics
   2. Organization
   3. Instructions
      a. Input/output (read/write)
      b. End of condition routine
      c. Branch on condition
   4. Peripheral operations
      a. Card to tape/disk
      b. Tape/disk to card
      c. Card/disk, card to print

V. LABORATORY PRACTICE

A. Problem

B. Symbols

C. Flowcharting

VI. QUINMESTER POST-TEST

BIBLIOGRAPHY
(Designing the Computer Program - Intermediate)

BEST COPY AVAILABLE

References:

1. Brown, John A. Computers and Automation. New York: Arco Publishing Company, 1968. Pp. 408.

2. Introduction to IBM Processing System, C20-1684-2. New York: IBM Technical Publication Department, 1965. Pp. 106.

3. Saxon, James A. and Steyer, Wesley W. Basic Principles of Data Processing. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1970. Pp. 332.

4. Wanous, S. J. and Wanous, Edward E. Automation Office Practice. Cincinnati: South-Western Publishing Company, 1964. Pp. 103.

5. _____. Fundamentals of Data Processing. Cincinnati: South-Western Publishing Company, 1971. Pp. 408.

A P P E N D I X

Quinmester Post-Test Sample

BEST COPY AVAILABLE

Quinmester Post-Test

Name _____ Date _____ Score _____

At the end of this 90-hour course, the student should be able to flow chart problem as stated below.

A. PROBLEM STATEMENT: Draw a system flow chart based on the following information:

1. Input to system will be two files on tape:
   a. Back Order File
   b. Receipt File

2. Output will be:
   a. Up-date Back Order File on tape (which will be used in the next process)
   b. Processed Receipt File (which will provide a printout for management titled "PROCESSED RECEIPT LISTING")
   c. Shipping Order File (which will be converted off-line into Shipping Order Cards)

B. PROBLEM STATEMENT:

Input is a card deck. Each card in the deck contains fields A, B, and C. The program is to compute the following formula:

Compute X = A + (B* X C).

Output will be a deck of cards containing the quantity X in each card.

C. PROBLEM STATEMENT:

Draw a flow chart for a sub-routine that utilizes a counter. A subroutine is not written in the same manner as a complete program; the normal start and finish are not required.

The subroutine will use two HOLD areas into which words are placed, one after the other.. One word into HOLD 1; the next word into HOLD 2; the third word overlays the word in HOLD 1; the fourth word overlays the word in HOLD 2, etc.

One test is made after each word has been entered, to find out if either of the words in the HOLD areas is the word NOT. If so, go to PROCESS 1; if not, go to fetch the next word.

After PROCESS 1 is finished, return to fetch the next word. The entire routine ends when the last word has been processed. Instead of HALT, use the word EXIT.

BEST COPY AVAILABLE

E. PROBLEM STATEMENT:

Read TIME cards and print a PAYROLL REGISTER. The TIME cards will be in employee number sequence by department number. As cards are being processed, write them on tape/disk (80 character record).

1. To calculate Gross, multiply hours times rate.
2. The over time rate is 1 1/2 of the regular rate times overtime hous equal OT Gross to be paid.
3. Total Gross is equal to Gross plus OT Gross for department totals and final totals.
4. Everytime the department changes, the totals for that department should be printed and you should skip to a new page, print the proper headings, and begin to process the new department.

INPUT:

EMPLOYEE NUMBER	DEPARTMENT NUMBER	NAME	RATE OF PAY	REGULAR HOURS	OVERTIME HOURS	MISCELLANOUS DATA
1-5	6-7	10-30	31-34	35 - 38	39-42	43 - 80

OUTPUT:

JACKSON DATA CORPORATION PAGE 01

DEPARTMENT	EMPLOYEE NO.	NAME	GROSS	OT GROSS
01	12456	Donald B. Adams	$1,324.00	$1,324.00
01	12457	Julio Bell	100.00	15.50
01	12458	Monica P. Ephriam	200.00	125.50

TOTAL EMPLOYEES THIS DEPARTMENT 00025

TOTAL GROSS THIS DEPARTMENT $1,114,577.79

- - - -

BEST COPY AVAILABLE

D. PROBLEM STATEMENT:

This problem will contain two input tapes; a Back Order Tape and a Receipt Tape.

Each file is contained on one reel of tape and both tapes are in sequence by item number. All items on back order will not be received and some items will be received that are not on back order.

Assume that there will always be more receipts than back orders and (to further simplify the problem) assume that the amount on back order is always less than the amount received.

As receipts are processed, they are checked against the Back Order File. If they match in item number:

(a) the amount on back order must be subtracted from the amount of the receipt.
(b) the difference is placed in the Processed Receipts file.
(c) each item from the Receipt File will be written on output Processed Receipt File, whether or not there is a match on back order.

If they do not match (receipt and back order check on item number), or when the Back Order Tape is exhausted:

(a) the balance of receipts are copied on the Processed Receipts Tape.
(b) the item from the Back Order Tape is written out on an updated Back Order Tape.

If a receipt and back order match in item number, this means that the material previously back ordered may now be shipped. Therefore the amount on back order must be placed on a Shipping Order Tape, from which cards will be produced off-line.

First, make a system flow chart of the inputs and outputs involved in the process, then a process flow chart showing the necessary operations that must be performed.

ANSWER KEY TO QUINMESTER POST-TEST

Grades will be determined by the instructor's evaluation.